

REMARKS

Reexamination and reconsideration of the application as amended are requested. Claim 14 has been rewritten in independent form. With respect to claims 1, 3, 7 and 9, Applicants have more definitely described “deformed” as “transversely and ductilely elongated”. Support for substituting “transversely and ductilely elongated” for “deformed” is found in the specification, page 5, lines 5-7, in claim 18, and in figures 6, 3 and 2 wherein figure 6 shows the “before” shape and figure 2 shows the “after” shape of the flange 26 of the crossover member 14 with the “after” shape clearly showing the at-least-one transversely and ductilely elongated portion 30 and/or 32. Support for adding in claims 1, 7 and 13 that the flange is supported “against radially-inward movement” by the ledge and support for adding in claims 1 and 7 that “the flange is supported against radially-inward movement by the ledge even without the at-least-one transversely-and-ductilely-elongated portion” is found from figures 2, 3 and 6 and from claim 14.

The examiner's rejection of claims 1-13 as being "anticipated", under 35 U.S.C. 102, or as being “obvious”, under 35 U.S.C. 103, is respectfully traversed. The examiner rejects these claims as being unpatentable over Welling '610. Claims 2-6 depend from claim 1, and claims 8-12 depend from claim 7.

Claims 1 and 7 require that the flange 26 of the crossover member 14 of the ball nut assembly 10 have at least one transversely and ductilely elongated portion 30 and/or 32 contacting the undercut wall 24 of the outer surface 18 of the ball nut 12 of the ball nut assembly 10. Claim 13 requires transversely and ductilely elongating the flange creating a staked portion of the flange which contacts the undercut wall of the outer surface of the ball nut. It is noted that “ductile” means capable of being permanently drawn out without breaking. Walling describes resilient deformation. During operation, the button 13 (crossover member) of Welling can work itself loose, cause jamming of the balls, and even pop out. Welling does suggest optionally locking the button 13 permanently in place using an epoxy (see column 4, lines 39-42), wherein such additional epoxy step is avoided in Applicants' claimed design.

It is noted that Yoshioka, cited by the examiner, mentions plastic deformation but describes only crimping the radially-outwardly-protruding guide walls 36 of the bridge (crossover) member 24 to the inner side faces of the mounting hole (through slot) 30 of the rotary (ball) nut 22. Such crimped guide walls 36 of Yoshioka are not a transversely and ductilely elongated portion of the bridge member 24 as required by applicants' claims. Also, the mounting hole 30 of Yoshioka does not have an undercut wall of the outer surface of the rotary nut 22 and the crimped guide wall 36 of the bridge member 24 of Yoshioka does not contact an undercut wall. Also, Yoshioka cannot have an undercut wall for the fixing member (crimping tool) 41 to operate. Applicants' claimed contact of a portion 30 or 34 of the flange 26 of the crossover member 14 with the undercut wall 24 of the outer surface 18 of the ball nut 12 provides a more secure attachment of the crossover member 14 compared with the crimping attachment of Yoshioka. Having a portion of a flange of a crossover member contact an undercut wall of the outer surface of the ball nut is not taught, suggested or described in Yoshioka.

Even if the Examiner would allege that the crimped guide walls 36 of Yoshioka are a transversely and ductilely elongated portion of the bridge member 24, the bridge member 24 of Yoshioka does not have a flange which is supported against radially inward movement by a ledge of the ball nut even without the transversely and ductilely elongated portion as required by applicants' claims 1 and 7.

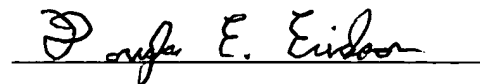
Applicants' claim 13 requires the step of disposing the crossover member 14 from outside the ball nut 12 to have the flange 26 supported against radially-inward movement by the ledge 22 and the crossover-grooved portion 28 disposed in the through slot 16 and then requires the step of transversely and ductilely elongating the flange 26. As previously mentioned, neither Welling nor Yoshioka transversely and ductilely elongates the flange. Further, Yoshioka does not include a step of disposing the crossover member from outside the ball nut to have the flange supported against radially-inward movement by the ledge of the ball nut. The bridge member 24 of Yoshioka is placed inside the ball nut and then is moved radially outward into the mounting hole to have arms 31 be supported against radially-outward movement by a ledge of the rotary nut 22 (see figure 9 and column 8, lines 17-20 of Yoshioka).

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Amendment

The Examiner mentioned, in the advisory action which did not enter an amendment after the final rejection, the need to consider Yoshioka in view of Maurer, Sata, Whitcomb, and Zagorski. The latter four patents disclose methods for attaching together two parts (which are unrelated to a ball-nut assembly) but their use in Yoshioka, even if deemed proper, cannot overcome Yoshioka's failure to have a flange which is supported against radially inward movement by a ledge of the ball nut even without the transversely and ductilely elongated portion as required by applicants' claims 1 and 7, and Yoshioka's failure to have a step of disposing the crossover member from outside the ball nut to have the flange supported against radially-inward movement by the ledge of the ball nut as required by applicants' claim 13. Of the four latter patents, Maurer, Whitcomb, and Zagorski appear to disclose crimping, and only Sata can be considered to disclose a transversely and ductilely elongated portion (see the winged portion of the shaft 8 in figures 8, 10 and 13). However, the shaft 8 of Sata lacks a flange supported against radially-inward movement by a ledge even without the transversely and ductilely elongated portion (the wings) as seen from figures 6 and 13. It is noted that not all plastic deformation is an elongation since plastic deformation at least includes crimping as well as ductile elongation.

Early consideration of the accompanying Request For Continued Examination and allowance of the claims are requested.

Respectfully submitted,



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